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ABSTRACT

The multivariable relationship between interviewer predictions of future career plans of applicants to medical school and students' characteristics at the time of their interviews was studied. The study also sought to determine the multivariable relationship between students' stated career plans at graduation and their characteristics at the time of the admissions interview. Variables that described the characteristics of applications who ultimately became members of the entering classes of 1990, 1991, 1992, and 1993 were obtained from student records. Thirteen members of the admissions committee reviewed one-page summaries of these variables for these students and predicted their career plans at graduation. Graduates of the classes of 1994, 1995, 1996, and 1997 who were entering the generalist residency programs of Family Medicine, Internal Medicine, and Pediatrics were surveyed regarding their career plans and then classified as pursuing a generalist career or not. Logistic regression was used to describe the relationships between the interviewer's predictions and applicants' characteristics and the relationships between students' career plans at graduation and their characteristics at their interviews. Of the 509 graduates for whom there were complete data, 189 had generalist plans at graduation. Interviewers' predictions of generalist career plans were significantly related to rural legal residence, lower science grade point average, lower parents' educational degree, and a high level of service involvement. The two variables with a significant empirical relation to student generalist plans at graduation were female gender and a high level of service involvement. Results show that academic performance at the time of the interview was not related to generalist career plans. (Contains 1 table and 19 references.) (SLD)

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# The Multivariable Relationship between Student Characteristics at Medical School Interview, Interviewer Predictions of Career Plans, and Student Career Plans at Graduation

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## ABSTRACT

**Background:** In an effort to admit more students inclined to select generalist careers, admissions committee interviewers at the University of Virginia (UVa) School of Medicine were asked to predict which applicants would be "most likely" to pursue generalist careers. It was not clear, however, which applicant characteristics were utilized to make these predictions.

The objective of this study was to determine the multivariable relationship between interviewer predictions of future career plans and student characteristics at the time of the interview. In addition, this study sought to determine the multivariable relationship between students' stated career plans at graduation and their characteristics at the time of the interview.

**Methods:** Variables that described the characteristics of applicants who ultimately became a member of the entering class of 1990, 1991, 1992, or 1993 were obtained from student records. Thirteen members of the 1997-1998 admissions committee volunteered to review one-page summaries of these variables for individual and to make a prediction of student career plans at graduation based on this information. Graduates in the Classes of 1994, 1995, 1996, and 1997 who were entering the generalist residency programs of Family Medicine, Internal Medicine, and Pediatrics were surveyed individually regarding their career plans and were classified as pursing or not pursing a generalist career. All other graduates entering residency programs were classified as not pursing a generalist career.

Logistic regression was utilized to describe the relationships between interviewers' predictions and applicants' characteristics as well as the relationships between students' career plans at graduation and their characteristics at the medical school interview. An alpha level of .05 was set for the significance level.

**Results:** Five hundred and nine graduates (n=509) had complete data for analysis. One hundred and eighty-nine (36.5%) had indicated generalist career plans at graduation, and the remaining

three hundred and twenty-three (63.5%) had indicated subspecialty career plans. Interviewers' predictions of generalist career plans were significantly related to rural legal residence (p=.02), lower science grade point average (p=.003), lower parents' educational degree level (p=.008), and a high level of service involvement (p=.001). The two variables with a significant empirical relation to student generalist career plans at graduation were female gender (p=.004) and a high level of service involvement (p=.04).

**Conclusions:** Admissions committee members predictions of generalist career choice were associated with rural legal residence, lower science grade point average, lower parents' educational degree level, and a high level of service involvement. However, only female gender and a high level of service involvement were significantly associated with student generalist career plans at graduation. The results of this study revealed that academic performance at the time of the medical school interview was not related to generalist career plans for graduates at the University of Virginia School of Medicine. These findings were reassuring that there is no need to compromise on academic quality as a result of seeking applicants who appear to be predisposed to a generalist career. It will be important to educate members of the admissions committee concerning these findings.

## Introduction

The 1992 report by the Council on Graduate Medical Education (COGME) entitled Improving Access to Health Care Through Physician Workforce Reform: Directions for the 21st Century outlined our nation's need for an increase in the number of primary care physicians.[1] Over the previous two decades, the number of graduates entering primary care specialties had steadily decreased. This trend was considered a major factor in the increased cost of medical care and the inadequate provision of health and medical care in some underserved areas.[2] Simultaneously, managed care delivery systems were penetrating the health care market, with the goal of providing cost-effective and high-quality medical care that could be best obtained by increasing the primary care physician workforce.[3]

One of the recommendations intended to increase the number of primary care physicians was for medical schools to examine their admissions practices with the goal of admitting more students inclined to select primary care careers [4] (family practice, general internal medicine, and general pediatrics). This approach also was recommended by the Association of American Medical Colleges, The American Medical Association, and the Institute of Medicine.[5-7] The role and possible effects of medical schools' admission policies on increasing the number of primary care physicians have been discussed by a number of writers and researchers.[8-11] Several studies have explored the characteristics of those who subsequently enter a primary care career. These studies have revealed that such characteristics at the time of matriculation such as being older[12], being female[13], having lower MCAT scores[14], having lower science GPAs[15], being involved in volunteerism[16], having few research experiences[17], and having non-physician parents [18]all were related to subsequent career choice. Little is known about the multivariable relationship between these characteristics and career choice. In addition, it is not known how members of admissions

committees use the information from these studies to assess the likelihood an applicant will ultimately choose a primary care career.

The purpose of this study was first, to determine the multivariable relationship between the characteristics of applicants to the University of Virginia School of Medicine and their career choice at graduation, and second, to determine the multivariable relationship between the characteristics of these applicants and admissions committee members' predictions of the likelihood that these applicants would choose a primary care career upon graduation from medical school.

The specific research questions addressed in this study were as follows: 1) What is the multivariable relationship between applicant characteristics at the time of the interview and their career choice upon graduation from medical school, and 2) what is the multivariable relationship between applicant characteristics at the time of the interview and interviewers' prediction of student career choice at graduation?

## Methods

Sources of data

First, thirteen variables that described the characteristics of applicants who ultimately became a member of the entering class of 1990, 1991, 1992, or 1993 were obtained from student records. These thirteen characteristics, or prediction variables, included quantitative and qualitative variables such as sex, age, MCAT scores, gpa, rural/nonrural status, level of service involvement, research experience, parents' education, and parents' occupations. (Table 1) Each of these variables had been associated with those medical school applicants who are more or less likely to enter primary care specialties in prior studies.

The quantitative variables, such as age, MCAT scores, and college major were obtained from the American Medical College Application Service (AMCAS) student profile sheet in each

student record. The legal residence rural/nonrural status was assigned by AMCAS, with the rural designation based on Standard Metropolitan Statistical Areas with a population of less than 50,000 people. College major was recoded as a "science" and "non-science" dichotomous variable, and race and parents' occupations were constructed as categorical variables. The parents' education variable was constructed by assigning a score for each parents' level of education and summing the two scores according to the following scoring system: 1 = high school degree or below; 2 = bachelors degree or below; 3 = masters degree; 4 = postgraduate degree.

The qualitative variables, which were level of service involvement and research related activities, were obtained from the AMCAS application utilizing a specific coding scheme for each variable based on specific decision rules. The level of service involvement for each student was determined by following the decision rules and coding methodology from a previous study.[16] The decision rules for research related activities were developed with another faculty research member. Fifty-nine randomly selected applications were coded by the researcher and the faculty research member utilizing the decision rules for each of these qualitative variables, and Cohen's weighted kappa was utilized to measure the level of agreement.

Second, thirteen members of the 1997-1998 admissions committee volunteered to review 35 to 45 one-page individual summaries of the prediction variables (e.g., age, college major, MCAT scores) collected on each applicant who ultimately became a member of the entering class of 1990, 1991, 1992, or 1993 and who subsequently graduated in 1994, 1995, 1996, and 1997. Upon reviewing each summary page, the admissions committee member made a prediction regarding the likelihood of that individual pursuing a primary care career upon graduation from medical school by giving

a percentage score that ranged from 0-100% (0% least likely, 100% most likely). Therefore, each graduate received one career prediction percentage score.

Third, the career choices were obtained during the spring of the students' fourth year using a career choice survey administered just prior to graduation from medical school. The survey was constructed to yield data regarding the students' top three career choices and their degree of certainty about each choice. There was a 100% return rate for each of the four classes of students.

This career choice survey was given only to those students entering the generalist residency programs of family medicine, internal medicine, and pediatrics. This refinement of the residency matching data (NRMP) was necessary to determine which of these graduates were oriented towards a primary care or a specialist career. Students were classified as pursing or not pursing a generalist career based on their first career choice given on this survey. All other students entering other residency programs were considered as pursing a subspecialty career.

Analysis of Data

The interviewers' career prediction percentages were recoded as a dichotomous variable (0% - 50%, not likely to enter a generalist career; 51 – 100%, likely to enter a generalist career). Results obtained from the multiple linear regression model provided the rationale for the recoding cut points. Logistic regression then was utilized to describe the empirical relationships between applicants' characteristics and student career choices at graduation, as well as applicants' characteristics and interviewers' predictions. An alpha level of .05 was set for the significance level.

## Results

Five hundred and nine out of 520 graduates (n=509) were retained in the study. Eleven were missing career outcome data and thus removed from the study. One hundred and eighty-six

(36.5%) indicated generalist career plans at graduation, and the remaining three hundred and twenty-three (63.5%) had indicated subspecialty career plans.

Of the total 509 predictions, 299 (59%) were correct relative to the choice of either generalist or nongeneralist careers given by the graduates on their surveys. Of the 182 "most likely to enter a primary care career" predictions, 79 (43%) were correct and 103 (57%) were incorrect relative to the choice of careers given by the 182 graduates. Regarding the 327 "not likely to enter primary care" predictions, 220 (67%) were correct and 107 (33%) were incorrect relative to the career choices.

1994-1997 Medical School Graduates

Interviewers' Predictions Relative to Graduates' Career Choice

(n=509)

| | Graduates' Choice Generalist | Graduates' Choice NonGeneralist |
|---|---|---|
| Interviewer Prediction Generalist | * 79 (43%) | 103 (57%) |
| Interviewer Prediction NonGeneralist | 107 (33%) | * 220 (67%) |

* Correct predictions

The student characteristics associated with the primary care career choice at graduation were being female (p= .004) and having a high level of service involvement (p= .04). The student characteristics associated with interviewers' prediction of a primary care career were rural legal

residence (p= .02), lower science grade point average (p= .003), lower parents' educational degree level (p= .008), and a high level of service involvement (p= .001).

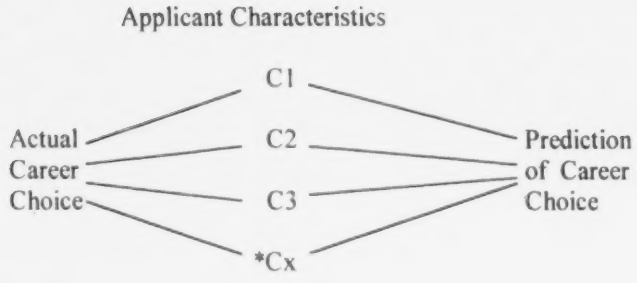
## Discussion

In making career predictions, the interviewers utilized variables thought to be associated with applicants who are most or less likely to enter primary care specialties. A number of studies have identified some of these variables, such as being female, older at matriculation, married, and having a desire to be involved in community service. These characteristics have been identified as being predictive of career choice at graduation, but it was unclear, however, which if any of these characteristics were predictive of career choice for graduates at the University of Virginia School of Medicine. In addition, in most studies only the bivariable relationship between an individual student characteristic and subsequent career choice has been evaluated. Few studies have determined the multivariable relationship between student characteristics and career choice.

It should be noted that the interviewers were able to make more correct predictions regarding those applicants who subsequently chose a subspecialty career upon graduation from medical school. This could indicate that it is more difficult to predict applicants who are likely to enter primary care, especially when applicants are aware of the emphasis being placed on these careers.

The lens model was utilized to describe both interviewers' predictions and the empirical relationships between applicants' characteristics and their career choice at graduation.[19] This method of analysis provided results that represent the degree to which the variables were used by the interviewers in making their career predictions compared with the empirical relationships between applicants' characteristics and their career choices at graduation.

The lens analysis model for this study is illustrated as follows:




* Cx - x applicant characteristics

The analysis of these data revealed that the career predictions made by the interviewers were significantly influenced by the rural legal residence (p=.02), lower science grade point average (p=.003), lower parents' educational degree level (p=.008), and a high level of service involvement (p=.001). In contrast, only being female (p=.004) and having a high level of service involvement (p=.04) were significant based on the empirical relationships between applicants' characteristics and their career choices at graduation.

Previous studies have demonstrated a relationship between career outcome and many of the variables that were identified as having significantly influenced the interviewers' career predictions. Therefore, it was reasonable for interviewers to be influenced by these characteristics. However, many of these studies have focused on just a few of the variables considered in this study. In addition, few studies have focused on the multivariable relationship between student characteristics and career choice. Finally, very few studies have utilized career choice survey data as the outcome variable for those graduates who are entering family practice, internal medicine, and pediatric residency programs.

There are a number of limitations that pertain to this study. For example, this study involved only those students who matriculated into the UVa School of Medicine. Analyzing data for students from one institution diminishes the generalizability of these study results. In addition, career choice at graduation from medical school was utilized

as the outcome measure. Acknowledging that these career choices will fluctuate as students proceed through residency, the strength of these relationships could change when students make their ultimate career choice upon completion of their residency training. Finally, career predictions were made by interviewers who reviewed one-page summaries of past medical school graduates. The judgment process, therefore, was not based on live, in-person interviews. Analysis of data set that was obtained from actual in-person interviews might yield different results from this analysis of a data set obtained from one-page summaries.

This study serves as the basis for a number of future research areas: 1) Comparing the multivariable relationship between applicant characteristics at the time of the interview with career predictions made by generalist faculty and specialist faculty on the admissions committee; 2) analyzing the qualitative components that affect interviewer career predictions; and 3) determining how admissions committee members might be trained to make more accurate career predictions.

In conclusion, the purpose of this study was to, first, determine the multivariable relationship between the characteristics of applicants to the University of Virginia School of Medicine and their career choice at graduation, and second, to determine the multivariable relationship between the characteristics of these applicants and admissions committee members' predictions of the likelihood that these applicants would choose a primary care career upon graduation from medical school. The findings of this study are reassuring that there is no need to compromise on academic quality as a result of seeking applicants who appear to be predisposed to a generalist career.

**Table 1**

**Predictive Variables Utilized in Logistic Regression Analysis**

n=509

| Variables | Number | Percentage | Mean | Medium |
|---|---|---|---|---|
| Race | | | | |
| Caucasian | 387 | 76.0 | | |
| Asian/Pacific Islander | 71 | 14.0 | | |
| African American/Other | 51 | 10.0 | | |
| Rural Legal Residence | | | | |
| Yes | 65 | 12.8 | | |
| No | 444 | 87.2 | | |
| Age | | | 21.8 | 21.0 |
| Gender | | | | |
| Female | 207 | 40.7 | | |
| Male | 302 | 59.3 | | |
| College Major | | | | |
| Science | 312 | 61.3 | | |
| Nonscience | 197 | 38.7 | | |
| Science GPA | | | 3.50 | 3.55 |
| All Other GPA | | | 3.58 | 3.62 |
| MCAT Science | | | 10.12 | 10.00 |
| MCAT Verbal | | | 9.77 | 10.00 |
| Research | | | | |
| Yes | 270 | 53.0 | | |
| No | 239 | 47.0 | | |
| Community Service | | | | |
| 2 (lowest community service) | 44 | 8.6 | | |
| 3 | 92 | 18.1 | | |
| 4 | 285 | 56.0 | | |
| 5 | 60 | 11.8 | | |
| 6 | 25 | 4.9 | | |
| 7 (highest community service) | 3 | .6 | | |
| Parent's Education Score | | | | |
| 2 (lowest education score) | 48 | 9.4 | | |
| 3 | 44 | 8.6 | | |
| 4 | 100 | 19.6 | | |
| 5 | 125 | 24.6 | | |
| 6 | 126 | 24.8 | | |
| 7 | 51 | 10.0 | | |
| 8 (highest education score) | 15 | 2.9 | | |
| Parent's Occupation | | | | |
| Either Parent M.D. | 91 | 17.9 | | |
| Either Parent Health-related | 88 | 17.3 | | |
| Either Parent Professional | 169 | 33.2 | | |
| Either Parent Business/other | 161 | 31.6 | | |

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